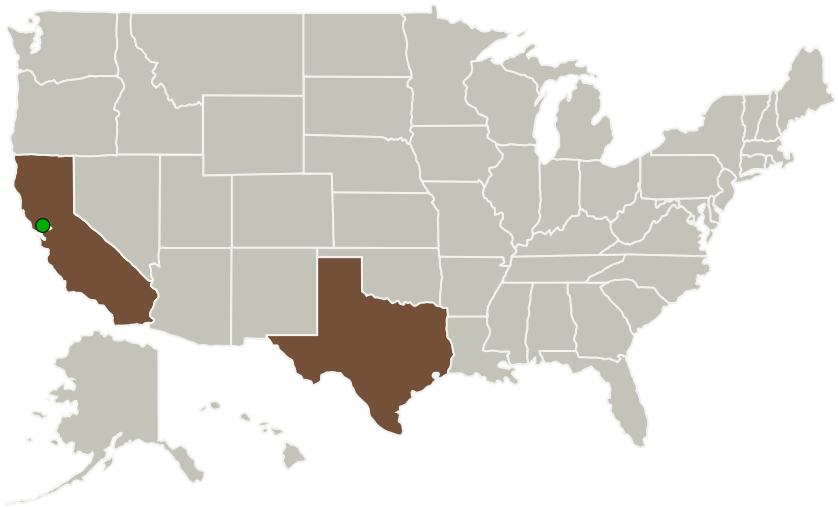
Adaptive Automation for Anomaly Resolution, Phase I

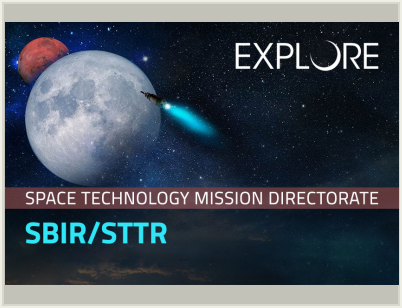
Completed Technology Project (2012 - 2012)

Project Introduction

As ground operations personnel and crew manage the operations of orbiting and exploration spacecraft, inevitably anomalies will arise. Resolving anomalies in real-time and preventing their future occurrence can be difficult. Operations personnel must capture the conditions leading up to the anomaly from voluminous telemetry logs; the development of a workaround is a trial and error process; users must also determine if the anomaly affects a piece of equipment or a class of equipment; and the reconfiguration of the equipment under the conditions of the anomaly may preclude certain other operations. Using software from previous research, we propose to design and develop an automation framework that provides 1) the ability to capture the system configuration at the time of the anomaly, using processed telemetry and execution states from both plan and procedure execution; 2) a workaround authoring capability to produce first flight notes and eventually full workaround procedures, derived from the original procedures; 3) the ability to efficiently modify the preconditions and the effects of the workaround as well as the configuration of the underlying models and the affected operational constraints; and 4) an interactive ability to generate operations plans that use the workaround procedures to test the workarounds, new operational constraints and other affected procedures.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
TRACLabs, Inc.	Lead Organization	Industry	Webster, Texas
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Texas

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137948)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

TRACLabs, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

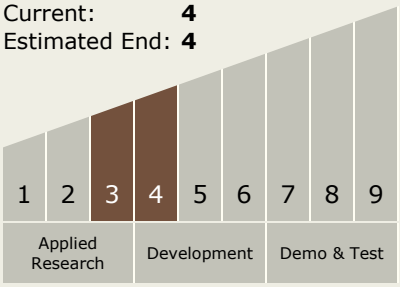
Carlos Torrez

Principal Investigator:

Russell Bonasso

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.6 Fault Response

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System